

**THE SEVENTH
INTERNATIONAL
CONFERENCE
ON NUMERICAL ALGEBRA
AND
SCIENTIFIC COMPUTING
(NASC 2019)**

(<http://lsec.cc.ac.cn/~NASCNAG/>)

College of Science
Nanjing Univ. Aeron. Astron.
Nanjing, P.R. China
October 19–23, 2019

NASC is an international conference organized by the Chinese numerical algebra group starting from 2006. The conference highlights recent advances in theoretical, computational, and practical aspects of linear and nonlinear numerical algebra. The aim of the conference is to gather numerical algebra and scientific computing experts to exchange ideas, and discuss future developments and trends, of these closely related fields.

The topics of NASC 2019 include but not limited to: direct and iterative methods for linear and nonlinear equations; solutions of least-squares problems; computations of eigenvalue problems; tensor decompositions and computations; parallel computations; constructions and analyses of preconditioners; methods and theories of structured matrices; randomized computations of matrix and tensor; and applications of numerical algebraic techniques and algorithms.

An important event during the conference is the award of the *Applied Numerical Algebra (ANA)* Prize which is awarded to the two best papers by young Chinese scientists working on numerical algebra and scientific computing.

SPONSORSHIP:

Nanjing University of Aeronautics and Astronautics

Academy of Mathematics and Systems Science, CAS

Journal of “Applied Numerical Mathematics”, IMACS

PROGRAM

OCTOBER 18 (FRIDAY) REGISTRATION and RECEPTION

15:00-17:30 REGISTRATION

Place: The Lobby of the Purple Hall

- Nanjing International Conference Hotel (NICH)
No. 2, Sifang City, Zhongshanlin
Xuanwu District, Nanjing, China
Tel.: +86-25-84430888

18:00- RECEPTION DINNER

Place: Rose Cafe and Purple Hall

The First Floor of Zijin Building
NICH

LECTURE VENUES:

October 19–22: The Caritas Hall
The First Floor of Lijing Building
NICH

OCTOBER 19 (SATURDAY)

OPENING CEREMONY and LECTURES

- 9:00-9:20 OPENING CEREMONY Chairperson: **Zhong-Zhi Bai**
- 9:20-9:45 GROUP PHOTO
- 9:45-11:15 INVITED TALKS Chairperson: **James G. Nagy**
- 9:45-10:30 **K. Vuik**: On the POD Deflated Preconditioned CG Method
- 10:30-11:15 **M. Tuma**: Sparse Linear Least Squares with a Few Dense Rows
- 11:15-11:30 TEA BREAK
- 11:30-12:00 CONTRIBUTED TALK Chairperson: **Raf Vandebril**
- 11:30-12:00 **J.G. Nagy**: Flexible Krylov Subspace Methods for Inverse Problems
- 12:20-14:00 LUNCH (Rose Cafe and Purple Hall, NICH)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Zeng-Qi Wang**
- 14:30-15:00 **A. Frommer**: Krylov Type Methods Exploiting the Quadratic Numerical Range
- 15:00-15:30 **Z.-Z. Bai**: On the Greedy Randomized Coordinate Descent Method
- 15:30-16:00 **J.-F. Yin**: A Class of Positive-Definite Operator Splitting Iteration Methods for Variable-Coefficient Space-Fractional Diffusion Equations
- 16:00-16:20 TEA BREAK
- 16:20-18:00 ANA PRIZE SESSION Chairperson: **Feng-Shan Bai**
- 16:20-16:45 **X.-P. Chen**: Stability Analysis of Time-Delay Systems Using a Contour Integral Method
- 16:45-17:10 **C.-Q. Miao**: On Local Quadratic Convergence of Inexact Simplified Jacobi-Davidson Method
- 17:10-17:35 **W.-T. Wu**: On Greedy Randomized Kaczmarz Method for Solving Large Sparse Linear Systems
- 17:35-18:00 **J.-L. Zhang**: An Efficient Variant of HSS Preconditioner for Generalized Saddle Point Problems
- 18:00-20:00 DINNER
Place: Rose Cafe and Purple Hall, NICH
The First Floor of Zijin Building
- 20:30- **SELECTION of APPL. NUMER. ALGEBRA PRIZE**
Place: No. 2 Conference Room
The Second Floor of Lijing Building, NICH
Panel Chairs: A. Frommer, J.G. Nagy and K. Vuik

OCTOBER 20 (SUNDAY)

LECTURES

- 9:00-10:30 INVITED TALKS Chairperson: **Andreas Frommer**
- 9:00-9:45 **V.R. Kostic:** *M*-matrices as a Tool for Spectral and Pseudospectral Analysis
- 9:45-10:30 **R. Vandebril:** Matrix Structures – Krylov – Gramians
- 10:30-10:40 TEA BREAK
- 10:40-12:10 INVITED TALKS Chairperson: **Jian-Yu Pan**
- 10:40-11:25 **D. Noutsos:** Perron-Frobenius Theory on Nonnegative Matrices – Extensions and Applications
- 11:25-12:10 **G. Wu:** On the General Matrix Exponential Discriminant Analysis Methods for High Dimensionality Reduction
- 12:20-14:00 LUNCH (Rose Cafe and Purple Hall, NICH)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Bo Yu**
- 14:30-15:00 **M. Tao:** On Glowinski’s Open Question on the Alternating Direction Method of Multipliers
- 15:00-15:30 **Z.-Q. Wang:** Restrictively Preconditioned Conjugate Gradient Method for Solving the Convection-Diffusion Constrained Optimization Problems
- 15:30-16:00 **Z.-R. Ren:** An LPSS Preconditioner for Non-Hermitian Saddle Point Problems with Applications to Time-Harmonic Eddy Current Models
- 16:00-16:20 TEA BREAK
- 16:20-17:20 CONTRIBUTED TALKS Chairperson: **Jun-Gong Xue**
- 16:20-16:50 **T.-X. Li:** Fast Eigensolver for 3D Maxwell Eigenvalue Problems in Photonic Crystal
- 16:50-17:20 **Y.-F. Jing:** A Deflated Version of the Block Conjugate Gradient Algorithm by Reducing Loss of Orthogonality
- 18:00-21:00 CONFERENCE DINNER of NASC 2019
(Including Issue of the Prize)
- Place:** The Restaurant Is Far Away From NICH
It Must Be Reached By The Conference Bus
- Notice:** The Bus Starts At 17:40 (Sharp !)
In Front Of The Lijing Building
No. 2, Sifang City, Zhongshanlin
Xuanwu District, Nanjing, China
- Tel:** +86-25-84430888

OCTOBER 20 (SUNDAY)

POSTER SESSION

9:00-17:20 POSTER SESSION Chairpersons: **Hao Liu and Xi Yang**

- B. Dong:** On the Adjoint of Tensors and Some Associated Musings
- G.-X. Huang:** An Adaptive Majorization-Minimization Generalized Krylov Subspace Method for ℓ_q -Optimization Problems with Applications to Image Restoration
- Y.-M. Huang:** Weighted Nuclear Norm Minimization Based Regularization Method for Image Restoration
- X. Li:** Shift-Splitting Iteration Method and its Accelerated Variant for Continuous Sylvester Equations
- Z.-Z. Liang:** Efficient Iterative Solvers for a Complex Valued Two-By-Two Block Linear System with Application to Parabolic Optimal Control Problems
- D.-D. Liu:** Relaxation Methods for Solving the Tensor Equation Arising from the Higher-Order Markov Chains
- Y.-N. Ma:** An Orthogonalization GMRES Method Based on Polynomial Preconditioning Generalized Minimal Residual Method
- X.-P. Wu:** A Preconditioned General Modulus-Based Matrix Splitting Iteration Method and Backward Errors of the Linear Complementarity Problem
- L. Zhang:** Fast Numerical Methods for Multidimensional Variable-Order Fractional Bloch-Torrey Equations

OCTOBER 21 (MONDAY)

LECTURES

- 9:00-10:30 INVITED TALKS Chairperson: **Kees Vuik**
- 9:00-9:45 **M. Hochstenbach**: Solving Polynomial Systems by Determinantal Representations
- 9:45-10:30 **F.-R. Lin**: IRK-WSGD Method for Space Fractional Diffusion Equations
- 10:30-10:40 TEA BREAK
- 10:40-12:10 CONTRIBUTED TALKS Chairperson: **Jun-Feng Yin**
- 10:40-11:10 **K.-Y. Lu**: On Banded M -splitting Iteration Methods for Solving Discretized Spatial Fractional Diffusion Equations
- 11:10-11:40 **X.-P. Guo**: On AIPCG-Based Iteration Methods for Toeplitz System of Weakly Nonlinear Equations
- 11:40-12:10 **N. Van Buggenhout**: Matrix Structures Related to Rational Krylov Subspaces
- 12:20-14:00 LUNCH (Rose Cafe and Purple Hall, NICH)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Zheng-Jian Bai**
- 14:30-15:00 **Y.-P. Zheng**: Cyclic Displacement and Inversion of a CUML Toeplitz Matrix
- 15:00-15:30 **S.-X. Zhu**: Average Information Splitting and Multi-Frontal Solvers for Heterogeneous High-Throughput Data Analysis
- 15:30-16:00 **Z.-G. Jia**: The Structure-Preserving Lanczos Method of Computing Partial Singular Value Triplets
- 16:00-16:20 TEA BREAK
- 16:20-17:50 CONTRIBUTED TALKS Chairperson: **Min Tao**
- 16:20-16:50 **J. Meng**: Perturbation Analysis of a Quadratic Matrix Equation with Structured Coefficients
- 16:50-17:20 **P.-C. Guo**: A Modified Newton Method for Multilinear PageRank
- 17:20-17:50 **Z.-H. He**: Some Quaternion Matrix Decompositions and their Applications
- 18:00-20:00 DINNER
Place: Rose Cafe and Purple Hall, NICH
The First Floor of Zijin Building

OCTOBER 22 (TUESDAY)

LECTURES and CLOSING CEREMONY

- 9:00-10:30 CONTRIBUTED TALKS Chairperson: **Zheng-Da Huang**
- 9:00-9:30 **A.-L. Yang:** A Parameterized Deteriorated PSS Preconditioner and its Optimization for Nonsymmetric Saddle Point Problems
- 9:30-10:00 **X. Yang:** A Fast Nullspace Method for the Unsteady Stokes Equations
- 10:00-10:30 **H.-B. An:** Preconditioning for Thermo-Mechanical-Contact Coupled Applications
- 10:30-10:40 TEA BREAK
- 10:40-12:10 CONTRIBUTED TALKS Chairperson: **Heng-Bin An**
- 10:40-11:10 **J.-J. Zhang:** A Relaxed Newton-Picard Like Method for Huber Total Variation Based Image Restoration
- 11:10-11:40 **Q. Niu:** Analysis of a Class of Dimensional Factorization Preconditioners
- 11:40-12:10 **Z.-Y. Liu:** The Relaxed Variants of ADI Iteration for Continuous Sylvester Equations
- 12:20-14:00 LUNCH (Rose Cafe and Purple Hall, NICH)
- 14:30-16:30 CONTRIBUTED TALKS Chairperson: **Zheng-Sheng Wang**
- 14:30-15:00 **X.-F. Duan:** Numerical Methods for Computing Two Kinds of the Best Hankel Tensor Approximations
- 15:00-15:30 **M.-L. Zeng:** Scaled Diagonal-Times-Toeplitz Splitting Iteration Methods for Solving Discretized Spatial Fractional Diffusion Equations
- 15:30-16:00 **H. Zhang:** Regularized Global GMRES for Solving Linear Discrete Ill-Posed Problems with Several Right-Hand Sides
- 16:00-16:30 **H.-F. Liu:** Frame Completions with Prescribed Norms via Alternating Projection Method
- 16:40-17:00 CLOSING CEREMONY Chairperson: **Zhong-Zhi Bai**
- 18:00-20:00 DINNER
Place: Rose Cafe and Purple Hall, NICH
The First Floor of Zijin Building

OCTOBER 23 (WEDNESDAY)

EXCURSION

9:00-17:30 EXCURSION (Self-Serviced and Self-Guided Excursion)

18:00-20:00 DINNER

Place: Rose Cafe and Purple Hall, NICH
The First Floor of Zijin Building

BRIEF HISTORY OF NASC:

NASC 2006: AMSS, Beijing, October 22–25

Co-Chairs: Raymond H. Chan and Zhong-Ci Shi

Special Issue: Journal of Computational and Applied Mathematics, 226:1(2009)

Special Issue Editors: Zhong-Zhi Bai, Lothar Reichel and Zhong-Ci Shi

NASC 2008: Nanjing Normal University, Nanjing, November 2-5

Co-Chairs: Iain S. Duff and Zhong-Ci Shi

Special Issue: Linear Algebra and Its Applications, 434:11(2011)

Special Issue Editors: Zhong-Zhi Bai, Michele Benzi, Iain S. Duff, Andreas Frommer and Zhong-Ci Shi

NASC 2010: AMSS, Beijing, October 23–27

Co-Chairs: Martin H. Gutknecht and Zhong-Ci Shi

Special Issue: Numerical Linear Algebra with Applications, 19:6(2012)

Special Issue Editors: Zhong-Zhi Bai, Iain S. Duff, Lothar Reichel and Zhong-Ci Shi

NASC 2012: Dalian University of Technology, Dalian, October 20–24

Co-Chairs: Lev A. Krukier and Zhong-Ci Shi

Special Issue: Journal of Engineering Mathematics, 89:1(2014)

Special Issue Editors: Zhong-Zhi Bai and Iain S. Duff

NASC 2014: Tongji University, Shanghai, October 25–29

Special Issue: BIT Numerical Mathematics, 56:2(2016)

Special Issue Editors: Zhong-Zhi Bai and Lothar Reichel

NASC 2016: Zhejiang University, Hangzhou, October 22–26

Special Issue: Numerical Linear Algebra with Applications, 25:4(2018)

Special Issue Editors: Zhong-Zhi Bai, Maya G. Neytcheva and Lothar Reichel

NASC 2019: Nanjing University of Aeronautics and Astronautics, Nanjing, October 19–23

Special Issue: Applied Numerical Mathematics, vol:no(2020)

Special Issue Editors: Zhong-Zhi Bai, Lothar Reichel and Zeng-Qi Wang

BRIEF HISTORY OF ANA PRIZE WINNERS:

NASC 2006: Heng-Bin An

NASC 2008: Zheng-Jian Bai

NASC 2010: Jun-Feng Yin

NASC 2012: Bo Dong and Lei-Hong Zhang

NASC 2014: Yang Cao and Chang-Li Liu

NASC 2016: Zhi-Ru Ren

BRIEF HISTORY OF ANA PRIZE COMMITTEE:

NASC 2006

Advisory Board: Iain S. Duff Gene H. Golub Zhong-Ci Shi

Members:

Feng-Shan Bai	Zhao-Jun Bai	Hua Dai	Iain S. Duff
Gene H. Golub	Martin H. Gutknecht	Ken Hayami	Lev A. Krukier
Tian-Gang Lei	Xing-Ping Liu	Wen Li	Lin-Zhang Lu
Shu-Fang Xu	Zhong-Ci Shi	Yang-Feng Su	

NASC 2008

Advisory Board: Iain S. Duff Zhong-Ci Shi Andrew J. Wathen

Members:

Zhong-Zhi Bai	Iain S. Duff	Ken Hayami	Volker Mehrmann
Zhong-Ci Shi	Yong-Zhong Song	Andrew J. Wathen	

NASC 2010

Advisory Board: Iain S. Duff Martin H. Gutknecht Zhong-Ci Shi

Members:

Raymond H. Chan	Iain S. Duff	Martin H. Gutknecht	Er-Xiong Jiang
Lev A. Krukier	Lothar Reichel	Zhong-Ci Shi	Yong-Zhong Song
Andrew J. Wathen			

NASC 2012

Advisory Board: Iain S. Duff Lev A. Krukier Zhong-Ci Shi

Members:

Hua Dai	Iain S. Duff	Ken Hayami	Lev A. Krukier
Maya G. Neytcheva	Lothar Reichel	Zhong-Ci Shi	

NASC 2014

Advisory Board: Ilse C.F. Ipsen Lothar Reichel Zhong-Ci Shi

Members:

Zhong-Zhi Bai	Hua Dai	Ken Hayami	Ilse C.F. Ipsen
Galina V. Muratova	Maya G. Neytcheva	Alison Ramage	Lothar Reichel
Miro Rozloznik	Zhong-Ci Shi	Kees Vuik	

NASC 2016

Advisory Board: Iain S. Duff Volker Mehrmann Zhong-Ci Shi

Members:

Feng-Shan Bai	Hua Dai	Iain S. Duff	Dan-Fu Han
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James G. Nagy	Maya G. Neytcheva	Alison Ramage	Miro Rozloznik
Zhong-Ci Shi	Jun-Gong Xue	Bo Yu	

NASC 2019

Advisory Board: Andreas Frommer James G. Nagy Kees Vuik

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Dan-Fu Han	Galina V. Muratova	James G. Nagy	Yong-Zhong Song
Kees Vuik	Jun-Gong Xue	Zeng-Qi Wang	